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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,399	10/30/2003	Supratik Guha	YOR920030425US1	3291

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EXAMINER	
JAGAN, MIRELLYS	

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 09/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/699,399	GUHA ET AL.	
	Examiner	Art Unit	
	Mirellys Jagan	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-12,15-23,29 and 30* is/are pending in the application.

4a) Of the above claim(s) *11,12 and 23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-10,15-22,29 and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5/25/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The indicated allowability of claims 3-10, 15-22, 29, and 30 is withdrawn in view of the newly discovered reference(s) to Davidson (U.S. Patent 6,140,141) submitted in the IDS filed on 5/25/05. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 4, 7, 8, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,140,141 to Davidson.

Davidson discloses a system comprising:

a duct adapted to be coupled with an electronic device, wherein the duct forms one side of the duct;

a coolant flowing through the duct so as to cool the electronic device; and

a photon detector (radiation detector 145) located adjacent to the duct for detecting photons emitted from the electronic device;

wherein the duct and coolant are at least partially transparent to photons with wavelengths between about 0.1 micron to 20 microns (1 micron); the coolant is either water or a

perfluorocarbon; the duct comprises a window of quartz or glass; and the device includes a protecting outer layer (is packaged) (see figures 2 and 3; column 2, line 30-column 3, line 2; and column 3, lines 39-49).

Referring to claim 7, the recitation that the system is for measuring thermal distributions is considered to be a recitation of the intended use of the system and has not been given patentable weight since it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. See *Ex parte Masham*, 2 USPQ2d 1647 (1987).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 3, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson in view of U.S. Patent 6,251,706 to Paniccia.

Davidson discloses a system having all of the limitations of claims 3, 9, and 10, as stated above in paragraph 3, and furthermore that photon detector detects the photons from the device during operation of the device under conditions for which the device is designed, and uses the detected photons to determine the voltages of the device. Davidson does not disclose the system comprising a processor coupled to the photon detector for generating a thermal distribution of the device based on the information from the photon detector, wherein the photon detector captures thermal information from the device during operation of the device under conditions for which it is designed, the photon detector being an IR camera.

However, Paniccia discloses a system for testing an electronic device during operation by detecting photons (IR radiation) from the device through an IR-transparent window (520) that is coupled to the device (502). A photon detector comprising an IR camera (760) is located adjacent the device to detect the photons emitted by the device for use by its processor in generating a thermal distribution (thermal map) of the device, the camera capturing thermal information from the device during operation of the device under conditions for which the device is designed. Paniccia discloses that it is known in the art to determine the voltage levels of the device as well as thermal information of the device by detecting photon emissions from the device when testing the device at its operating capacity, and that the IR camera (760) of his embodiment can determine the voltage levels of the device as well as thermal information. The thermal information is important since it allows proper thermal regulation of the device to

prevent thermal degradation (see figure 7D; column 1, line 66-column 2, line 9; column 2, lines 26-35 and 43-55; and column 7, lines 13-37).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system disclosed by Davidson by replacing the photon detector with an IR camera, as taught by Paniccia, in order to also determine the thermal characteristics and generate a thermal map of the device from the detected photons to prevent thermal degradation.

7. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson in view of U.S. Patent 5,349,499 to Yamada et al [hereinafter Yamada].

Davidson discloses a system having all of the limitations of claim 5, and 6 as stated above in paragraph 3, but is silent as to the type of perfluorocarbon used, and therefore does not explicitly disclose the coolant being one of alkanes and perfluoroalkanes, or one of perfluorooctane, perfluorohexane, octane, hexane, and carbon tetrachloride.

Yamada discloses that perfluorooctanes and perfluorohexanes are known perfluorocarbons used as liquid coolants for semiconductor devices, and that other perfluorocarbons having the formula CnF_{n+2} are also useful as liquid coolants for cooling electronic devices (see column 1, line 58-column 2, line 2; and claim 9).

Referring to claim 5, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system disclosed by Davidson by using perfluoroalkanes as the liquid coolant since perfluoroalkanes have a molecular formula of $C_{24}F_{50}$,

and Yamada teaches that perfluorocarbons having the molecular formula C_nF_{n+2} are useful as liquid coolants for use in cooling electronic devices.

Referring to claim 6, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system disclosed by Davidson by using perfluorooctanes or perfluorohexanes as the perfluorocarbon, since Yamada teaches that these are known useful liquid coolants for use in cooling electronic devices.

8. Claims 15, 16, 19-22, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson in view of Paniccia.

Davidson discloses a system for detecting photons (IR radiation) of an electronic device during operation, the method comprising:

detecting photons from an electronic device during operation of the electronic device using a photon detector (IR radiation detector 145), and the photon detector is adjacent to a duct comprising quartz or glass that is adjacent to the electronic device;

wherein the photons are indicative of a thermal characteristic of the electronic device (infrared radiation is inherently thermal radiation and therefore indicative of temperature); the electronic device forms one side of the duct and a coolant comprising water or a perfluorocarbon flows through the duct so as to cool the electronic device; the duct and the coolant are at least partially transparent to photons with wavelengths between about 0.1microns to 20 microns (infrared radiation); the photon detector captures the photons from the device during operation of the device under conditions for which it is designed; and the device includes a protecting outer

layer (is packaged) (see figures 2 and 3; column 2, line 30-column 3, line 2; and column 3, lines 39-49).

Davidson discloses the method using the detected photons to determine the voltages of the device, but does not disclose the photons being used to detect a thermal characteristic of the device; and generating a thermal distribution of the device based on information from the photon detector.

However, Paniccia discloses a system for testing an electronic device during operation by detecting photons (IR radiation) from the device through an IR-transparent window (520) that is coupled to the device (502). A photon detector comprising an IR camera (760) is located adjacent the device to detect the photons emitted by the device for use in generating a thermal distribution (thermal map) of the device, the camera capturing thermal information from the device during operation of the device under conditions for which the device is designed. Paniccia discloses that it is known in the art to determine the voltage levels of the device as well as thermal information of the device by detecting photon emissions from the device when testing the device at its operating capacity, and that the IR camera (760) of his embodiment can determine the voltage levels of the device as well as thermal information. The thermal information is important since it allows proper thermal regulation of the device to prevent thermal degradation (see figure 7D; column 1, line 66-column 2, line 9; column 2, lines 26-35 and 43-55; and column 7, lines 13-37).

Referring to claim 19, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method disclosed by Davidson by replacing the photon detector with an IR camera, as taught by Paniccia, in order to also determine the thermal

characteristics and generate a thermal map of the device from the detected photons to prevent thermal degradation.

9. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson and Paniccia, as applied to claims 15, 16, 19-22, and 30 above, and further in view of Yamada.

Davidson and Paniccia disclose a method having all of the limitations of claims 17 and 18, as stated above in paragraph 8, but are silent as to the type perfluorocarbon used, and therefore do not explicitly disclose the coolant being one of alkanes and perfluoroalkanes, or one of perfluorooctane, perfluorohexane, octane, hexane, and carbon tetrachloride.

Yamada discloses that perfluorooctanes and perfluorohexanes are known perfluorocarbons used as liquid coolants for semiconductor devices, and that other perfluorocarbons having the formula CnF_{n+2} are also useful as liquid coolants for cooling electronic devices (see column 1, line 58-column 2, line 2; and claim 9).

Referring to claim 17, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method disclosed by Davidson and Paniccia by using perfluoroalkanes as the liquid coolant since perfluoroalkanes have a molecular formula of $C_{24}F_{50}$, and Yamada teaches that perfluorocarbons having the molecular formula C_nF_{n+2} are useful as liquid coolants for use in cooling electronic devices.

Referring to claim 18, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method disclosed by Davidson and Paniccia by

using perfluorooctanes or perfluorohexanes as the perfluorocarbon, since Yamada teaches that these are known useful liquid coolants for use in cooling electronic devices.

Response to Arguments

10. Applicant's arguments with respect to claims 3-10, 15-22, 29 and 30 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 5/25/05 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mirellys Jagan whose telephone number is 571-272-2247. The examiner can normally be reached on Monday-Friday from 11AM to 4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ
September 21, 2005

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